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FORM PTO-1390 (REV 10-94) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C.

Attorney's Docket No. 23rd PCT/PTO 23 JUL 2001
NAA-CAI-P23

U.S. APPLICATION NO. (If known, see 37 C.F.R.) 09/890001

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/JP00/00534	01 February 2000	01 February 1999

TITLE OF INVENTION
AN INPUT SIGNAL RECOGNITION SYSTEM HAVING GROWING FUNCTION THROUGH FEEDBACK

APPLICANT(S) FOR DO/EO/US
RYU, Tadamitsu

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. [X] This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. [X] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [ ] is transmitted herewith (required only if not transmitted by the International Bureau).
   b. [X] has been transmitted by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US)
6. [X] A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. [X] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] have been transmitted by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.
8. [ ] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. [X] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [ ] A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. [ ] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A FIRST preliminary amendment. enclosed
    [ ] A SECOND or SUBSEQUENT preliminary amendment.
14. [ ] A substitute specification.
15. [ ] A change of power of attorney and/or address letter.
16. [ ] Other items or information:

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5)	INTERNATIONAL APPLICATION NO.	JC17 Rec'd PCT/PTO	ATTORNEY DOCKET NUMBER
09/890001	PCT/JP00/00534		NAA-CAI-P23

17. [X] The following fees are submitted:

	CALCULATIONS PTO USE ONLY
BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)): 860.00	
X Search Report has been prepared by the EPO or JPO..... ~~$850.00~~	
International preliminary examination fee paid to USPTO (37 CFR 1.482) $660.00	
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2))..$730.00	
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO..... $980.00	
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)..... $92.00	
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 860.00
Surcharge of **$130.00** for furnishing the oath or declaration later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	14 -20 =		X $22.00	$
Independent claims	2 -3 =		X $76.00	$
MULTIPLE DEPENDENT CLAIM(S) (if applicable) see Prel. Amdt.			+ $240.00	$
TOTAL OF ABOVE CALCULATIONS =				$ 860.00
Reduction by 1/2 for filing by small entity, if applicable. ~~Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).~~ status claimed.				$ 430.00
SUBTOTAL =				$ 430.00
Processing fee of **$130.00** for furnishing the English translation later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$
TOTAL NATIONAL FEE =				$ 430.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +				$
TOTAL FEES ENCLOSED =				$ 430.00
			Amount to be: refunded	$
			charged	$

a. [X] A check in the amount of $ 430.00 to cover the above fees is enclosed.

b. [ ] Please charge my Deposit Account No. _____ in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 15-0699. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SIGNATURE: Leighton K. Chong

NAME: Leighton K. Chong

REGISTRATION NUMBER: 27,621

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
U.S. DESIGNATED OFFICE UNDER 35 U.S.C. 371

In Re Patent Application Of:	Dkt.#: NAA-CAI-P23
RYU	
Serial No.: (To Be Assigned)	
Filed: (Concurrently Herewith)	
Title: INPUT SIGNAL RECOGNITION SYSTEM HAVING GROWING FUNCTION THROUGH FEEDBACK	July 20, 2001

PRELIMINARY AMENDMENT

Commissioner of Patents
U.S. Patent & Trademark Office
Washington, D.C. 20231

Sir:

Pursuant to the filing of the above-identified patent application under 35 U.S.C. 371, please preliminarily amend the application as follows:

IN THE SPECIFICATION:

Please insert the following sentence after the Title: --This U.S. patent application claims the priority of PCT International Application No. PCT/JP00/00534, filed on February 1, 2000 based on the priority of Japanese Patent Application No. 59106/1999, filed on February 1, 1999.--

IN THE CLAIMS:

Please amend the following claims of the claims as previously amended in the Amendment Under Article 19, as shown:

In Claim 3, line 2, change the claim dependency reciting "Claim 1 or 2" to --Claim 1--.

In Claim 4, line 2, change the claim dependency reciting "any of Claim 1-3" to --Claim 1--.

In Claim 6, line 2, change the claim dependency reciting "any of Claim 1-5" to --Claim 1--.

In Claim 10, line 2, change the claim dependency reciting "Claim 8 or 9" to --Claim 8--.

In Claim 11, line 2, change the claim dependency reciting "any of Claims 8-10" to --Claim 8--.

In Claim 13, line 2, change the claim dependency reciting "any of Claim 8-12" to --Claim 8--.

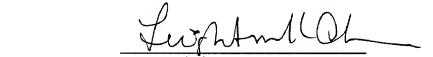
REMARKS

The claims are amended from multiple dependency to all single dependency form.

The total number of claims and number of independent claims after amendment are within the number paid for with the filing of this application (small entity). However, if any

additional fees are deemed to be due for acceptance of this Preliminary Amendment, authorization is given to charge our Deposit Account No. 15-0699.

Respectfully submitted,
ATTORNEYS FOR APPLICANT



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Specifications

An Input Signal Recognition System Having Growing Function Through Feedback

Related Art

The present invention is related to the recognition system of various information that uses a computer, particularly is related to the system which makes recognition disposition efficiently of data taken in by various sensors, by utilizing a computer. Moreover, it is related to the system of planning to improve an appearance recognition rate wherein, as to the object that is impossible to recognize, by disposition of inquiry to a human being, judgments of the human being is taken in and are accumulated as example data.

Related Art

Conventionally, in order to recognize various information, it took them in by many sensors and made said information in a digital, and recognition disposition had been conducted by making a variety of processes corresponding to its necessity. Especially in an image it made many dispositions to abstract necessary information and then recognized it. For example, it had separated a recognition target and background by using great amount of times and hardware; that is, if it was a moving body, an image on each time was memorized and compared them such that the separation of background was performed by comparing a changeless part with a changed part.

As mentioned above, prior art received the information through various sensors and disposed of it by digitalizing. But if there were many sensors, the information that was taken in by sensors became enormous volume or a disposition condition became complex, resulting in taking much time to dispose of recognizing. At the same time, a scale of system became too big, and it was not realistic to commercialize it.

Therefore, a purpose of the present invention is to construct an input signal recognition system at actually usable working speed or a scale of realistic level by taking the above mention prior art demrits away.

Furthermore, when the sensor information was disposed and recognition was made, actually in almost all cases, most part of the resources was used

to the pre-disposing step for that the system made any judgments. But as a data that was not related to the judgment was also disposed, it really made useless one. By eliminating the above disposition useless, it becomes possible to increase the working speed and to construct the system of a reasonable scale; that is, the present invention realizes the system that disposes of only necessary data for judgments to make necessary judgments.

Particularly in image recognition of present condition, it was necessary to dispose of the enormous image data. Above enormous data included the data that was not necessary for any judgments. The present invention realizes the system that disposes of only necessary image data to make necessary judgments.

Disclosure of the Invention

To resolve the above problems, in the present invention, sensors are made in intelligence, that is, memories are set up that stores comparative data for judgment on the sensors or at just behind the sensors. And data definition for comparison is provided from the computer and set on said memory part. Further, comparative part that compares information collected by the sensors with said definition set is provided such that it outputs the recognition signal only when the sensors information is the same as the data definition set.

Actually, in the recognition target identifying system of computer, the system comprises sensor(s); data disposition part(s) that pre-dispose(s) of data that is recognized by the sensor(s); a definition set part that is connected to a data base (an object definition dictionary) that possesses at least one data definition of a recognition target; and an object that compares the pre-disposed data with previously set definition and condition, and fires; and, said definition set part setting the data definition on the object.

The disposition procedures at that time comprise:

A: a step that sets the respective data definition on the respective object according to the recognition target;

B: a step that takes the data of the recognition target in by sensor(s);

C: a step that pre-disposes of said data;

D: a step that compares said pre-disposed data with the previously set data definition and fires to output the recognition signal only when there exists recognition target data corresponding to the definition;

E: a step that resets the data that the object received according to the previously set definition;

F: a step that outputs the recognition signal when the recognition of input signal is completed.

And if there are too many sensors and a firing condition is complex, it is better that it comprises: sensor(s); data disposition part(s) that pre-dispose(s) of data that is recognized by the sensor(s); a definition set part that is connected to a data base (an object definition dictionary) that possesses data definition of respective recognition parts of a recognition target and object definition; and recognition signal transmission objects that take outputs from the other objects and compare the same with previously set definition and condition, and fires; recognition target judgment objects that compare the pre-disposed data with previously set definition and condition, and fires; and, said definition set part setting the data definition on the recognition target judgment object after taking the same from the data base while setting the object definition on the recognition signal transmission object.

The disposition procedures at that time comprise:

A: a step that sets the respective data definition on the respective recognition target judgment object while sets the respective object definition on the respective recognition signal transmission object according to the recognition target;

B: a step that designates one of the recognition signal transmission object as an output place to the recognition target judgment objects when the data definition referred and the firing definition are satisfied;

C: a step that takes the data of the recognition target in by sensor(s);

D: a step that pre-disposes of said data;

E: a step that informs it to the predetermined recognition signal transmission object when there exists a pre-disposed data that meets the data definition;

F: a step that takes the output from the predetermined object only when it is informed from the same in advance;

G: a step that resets retained data owned by itself according to a necessity of the definition;

H: a step that compares said output from the predetermined object with the object definition and informs it to the predetermined recognition

signal transmission object only when it meets the object definition and the firing condition;

I: a step that outputs the recognition signal when the output from the predetermined object meets the definition at the upper most level recognition signal transmission object.

And when the recognition of input signal is not done well, it is better to add the following steps, thus,

A: a step that finds failure in the recognition of the input signal;

B: a step that makes inquiry to the operator;

C: a step that receives a response from said operator;

D: a step that registers said response to the object definition dictionary.

To make input signal recognition always to the newest information, each object must be kept watching, and when a part of the firing condition of said object is satisfied, it investigates a related object to make said object fire and/or be equipped with DEMON in the present system, that resets a memory.

By said ways, as it disposes of only necessary information at the sensor(s) or just behind the sensor(s), a useless disposition can be eliminated. It makes possible the efficient input signal recognition. Especially in the image recognition, as it is enough to make the lowest volume of the necessary disposition without conducting a great amount of disposition, the recognition with realistic system construction and having no practical problem in its working speed can be obtained.

Brief Explanation of The Drawings

Figure 1 is a block diagram indicating one embodiment the of the recognition target identifying system of computer in accordance with the present invention.

Figure 2 is a block diagram indicating the second embodiment of the recognition target identifying system of computer in accordance with the present invention.

Figure 3 is a data chart showing the data definition that is input in the recognition target judgment object of the recognition target identifying system of computer as shown in Figure 2.

Figure 4 is a data chart showing the firing condition and its disposition that is input in the recognition target judgment object of the

recognition target identifying system of computer as shown in Figure 2.

Figure 5 is a data chart showing the temperature data that is output as a judgment result at each of the recognition target judgment objects.

Figure 6 is a data chart showing the firing condition and its disposition that is input in the recognition target judgment object of the recognition target identifying system of computer as shown in Figure 2.

Figure 7 is a block diagram indicating the third embodiment of the recognition target identifying system of computer in accordance with the present invention.

The Best Mode of the Invention

(The first embodiment)

Figure 1 is the first embodiment of the present invention, and it disposes or analyzes at high speed on a parallel disposition of one or a plural of human being(s), for example, his(her) or their characteristic of face and applies to identification.

11 is an input sensor or a camera for taking characteristic of faces as an image data. 12 is an image disposing part or an image pre-disposing part that cuts image target parts of eyes, nose, mouth, etc. as a factor of face, from image data that is taken at the camera 11, by the way of pattern matching etc..

13 is a recognition area that includes a group of the recognition target judgment objects A-C, that finds elements of face at base on the image data from the image pre-disposing part 12 and that transmits its result to a related object. Meanwhile A, B, and C are objects to find; A for eyes, B for nose, and C for mouth.

To each object A, B, and C for recognizing eyes, nose, and mouth, necessary data and methods for the recognition target judgment are set up by the definition set part 15. 14 is a recognition signal transmission area that values each part, (eyes, nose, and mouth), and the ways of valuation that each objects uses and the firing condition of signal transmission are set by the definition set part 15. D is an object that makes a comparative valuation of eyes and nose, and their relation image. It transmits its recognition signal and also possesses the function that makes self-output to self-input or self-designation. E is an object that makes a comparative valuation of nose, and transmits its recognition signal. F is an object that

makes a comparative valuation of mouth, and transmits its recognition signal. It also possesses the function that makes self-output to self-input or self-designation.

G is an object that puts D (the object that makes a valuation of eyes and nose, and their relation image to transmit its recognition signal) and B (an object that makes a valuation of nose to transmit its recognition signal) together so that the combined recognition signals can be compared with those of a face be identified, and transmit its conformity level. H is an object that puts E (an object that makes a valuation of nose, and transmits its recognition signal) and F (an object that makes valuation of mouth, and transmits its recognition signal) together so that the combined recognition signals can be compared with those of face to be identified, and transmits its conformity level. I is an object that makes general valuation of the face based on the valuation results transmitted from G and H.

Here, an each relation of a group of objects A, B, C, ...H, I shown in Figure 1 will be explained in details. To A-C in the recognition area 13, each image characteristic data of a target part from the image pre-disposing part 12 is handed or set.

In A, by the definition set part 15, eyes of human being P1 is set in advance as identifying object target part of the image characteristic data, and it abstracts all target parts of the object to be identified wherein the conformity level of eyes is more than 70% and transmits the recognition signal to the recognition signal transmission object D in the recognition signal transmission area 14. When the conformity level of compared parts is under the gate value (in this case, under 70%), this object doesn't fire.

In B, by the definition set part 15, nose of human being P1 is set in advance as identifying object target part of the image characteristic data, and it abstracts all target parts of the object to be identified wherein the conformity level of eyes is more than 60% and transmits the recognition signal to the recognition signal transmission objects D, G and E in the recognition signal transmission area 14. When the conformity level of compared parts is under the gate value (in this case, under 60%), this object doesn't fire.

In C, by the definition set part 15, mouth of human being P1 is set in advance as identifying object target part of the image characteristic data, and it abstracts all target parts of the object to be identified wherein the

conformity level of mouth is more than 80% and transmits the recognition signal to the recognition signal transmission object D in the recognition signal transmission area 14. When the conformity level of compared parts is under the gate value (in this case, under 80%), this object doesn't fire.

In the recognition signal transmission object D in the recognition signal transmission area 14, is previously set by the definition set part 15, a condition wherein it fires when the conformity level of the signal from A is more than 95%, a disposition wherein a signal from the same A is input to itself after 0.3 seconds, due to a delay timer, without firing when the conformity level of the signal from A is not more than 95%, a request wherein, in case of that 0.2 seconds has passed from one input of signal A or B and the other signal doesn't reach, a signal is required to dispatch to the other signal origin whose signal doesn't reach, or a function wherein it confirms the reason of not dispatching to the signal origin object. Here, as to the object D, the reason why the delay timer is used is because in the case of the object of eyes, it tends to happen blinks, and when the image on blinks is input, the conformity level declines remarkably. So it delays the time and adds the function that evaluates again. When this object fires, the recognition signal is transmitted to G.

In the recognition signal transmission object E of the recognition signal transmission area 14, is previously set by the definition set part 15, a condition wherein it fires when the conformity level of a signal from B is more than 80%, and then the recognition signal is transmitted to H.

In the recognition signal transmission object F in the recognition signal transmission area 14, is previously set by the definition set part 15, a condition wherein it fires when the conformity level of the signal from C is more than 90%, or a disposition wherein a signal from the same C is input to itself after 0.5 seconds, due to a delay timer, without firing when the conformity level of the signal from C is not more than 90% Here, as to the object F, the reason why the delay timer is used is because, in the case of the object of mouth, when the image on moving mouth is input, the conformity level declines remarkably. So it delays the time and adds the function that evaluates again. When this object fires, the recognition signal is transmitted to G.

In the recognition signal transmission object G in the recognition signal transmission area 14, is previously set by the definition set part 15, a

condition wherein it fires when the conformity level of the signal from D or B is more than 97% and/or it fires when the conformity level of their combinational evaluation is more than the gate value (in this case, 97%). And in the case of firing, the recognition signal is transmitted to I. If the conformity level is under the gate value (in this case, 97%), this object doesn't fire.

In the recognition signal transmission object H in the recognition signal transmission area 14, is previously set by the definition set part 15, a condition wherein it fires when the conformity level of the signal from E or F is more than 87% and/or it fires when the conformity level of their combinational evaluation is more than the gate value (in this case, 87%). And in the case of firing, the recognition signal is transmitted to I. If the conformity level is under the gate value (in this case, 87%), this object doesn't fire.

In the recognition signal transmission object I in the recognition signal transmission area 14, is previously set by the definition set part 15, a condition wherein it fires when the conformity level of the signal from G is more than the gate value (in this case, 70%), a condition wherein it fires when the conformity level of the signal from H is more than 80%, a condition wherein it fires when the conformity level of E & F combinational evaluation is more than the gate value (in this case, 87%), a function wherein it confirms the reason of not dispatching to H when 0.5 seconds has passed from the input of signal G and the signal from H doesn't reach, or a function wherein it doesn't fire under other condition. And in the case of firing, the recognition signal is transmitted to a face identifying disposition part 17.

When H receives an inquiry and does not know the cause by itself, it also inquiries to the source. In this case, when the signal from E is over the gate value but if the signal from F is under the gate value (87%), it is possible to send inquiry signal to F. For example, if it is a cause that the conformity level of the mouth image at F is low, it transmits this situation to H and I. In I, it shows concerned image to the operator and inquiries the disposition.

In the case of that the person to be identified wears a mask, the operator confirms that the man wears a mask through the image. Then a mask, as a kind of mouth, is added as the knowledge to the data base 16 to establish higher evaluate point, and it makes the additional definition to C through the definition set part15. After the additional definition, a person

who wears a mask is possible to be identified, too. As a definition to H, if it is defined that it is possible that a man wears a mask when the conformity level is far below the gate value, for example under 40%, the man is asked to take a mask off thereby improving the recognition rate further.

In the face identifying disposition part 17, each element of face is synthetically judged and identified.

A face-identifying arrangement that consists of a group of objects mentioned above is prepared for an each person. And it transmits input from these face-identifying arrangements to the face identifying disposition part 17. In object of the face identifying disposition part, based on many signals that are transmitted from the face identifying disposition parts, it outputs a face having the highest conformity level by judgment of it. According to this, as to the hundreds of thousands of face data, by parallel disposing, it becomes possible to identify the face that is taken in by the camera 11 in an instant.

In this embodiment, the recognition target is images, but it is possible that it is chosen at least one from animation, stationary images, lines, dots, words, characters, voices, sounds, times and electrical signals.

Further, in this embodiment, a camera is used as a sensor, but it is possible to choose at least one from a camera, an image scanner, a microphone, a thermometer, timer and switch.

Moreover, in this embodiment, the pre-disposing is pattern matching , but it is possible to choose at least one from tracking, functioning, on/off signalizing, numeralizing, coordinating, parametering and outlining.

(The second embodiment)

Next, the second embodiment in accordance with the present invention will be explained with referring to Figure 2. This embodiment is a system that finds an omen of unusual fire baking from temperature changes with time in fire baking furnace. Here the system compares many temperature sensors (thermo-couples) with the temperature set previously, and finds the problems (including the trouble of sensors).

Here, 21 is the block of a temperature sensor and 22 is an object receptacle having recognition target judgment objects of A, B, ...J. The temperature sensors are provided at 100 points of A1, A2...A10, B1, B2...B10, C1, C2...C10 to J1, J2...J1 in the fire baking furnace. They are grouped into

10 from A-J. And on the recognition target judgment objects and recognition signal transmission objects provided in 21 and 23, data definition and object definition are set by the definition set part 24. 25 is a data base in which the data definition and the object definition are recorded, and is connected to the definition set part 24.

The definition set part 24 extracts the data definition and the condition data to make various judgments from data base 25, and sets them up to each of the respective recognition signal transmission object a, b...j.

Next, the disposition thereof will be explained concretely. Figure 3 is a data table showing the data set on the recognition target judgment objects A, B...J, and said data indicates the temperature(℃) in a specific time. This shows the range of temperature of each block A, B--J. The data definition of A is 280～290℃, and the temperature sensors A1, A2...A10 in A block compare the detected temperature with this data definition. In the same way each block of B...J makes a comparison.

Each condition is showed in Figure 4. For example, the object A checks A block, and outputs to the object "a" a number of sensor together with its temperature data which falls outside of the range of 280～290℃. In the same way, it disposes of each block of B...J with each condition.

In Figure 5, the number of sensor and temperature data taken by each of the objects. With seeing the sensors in A block, as the temperature of sensor A1 is more than 293℃, it is output in the form of [293<A1] on the object "a" from object A to object "a". In the same way, the objects of B...J outputs the data which fall beyond the limits of Figure 3 to an each object "b", "c"..."j". In Figure 6, the object definitions of objects "a", "b", "c", ..."j" are indicated.

When there are more than 2 objects that satisfy the object condition shown in Figure 6, that is, there are 2 extraordinary blocks, it outputs the signal showing that it is unusual, together with its block number and the temperature data of the unusual parts. In this embodiment described here, the objects "c", "f", "h" and "I" fire, and the unusual signal together with the block number C, F, H and I and each temperature data are output by comparing the conditions of Figure 6 with the output results to the objects of Figure 5.

(The third embodiment)

Figure 7 indicates the outline of the third embodiment. The process wherein a signal from a group of sensors is pre-disposed to make data at 71, data definition recorded in the data base 76 is set on the object, and recognition disposition has made at a group of objects 72 is already explained fully.

In the recognition process mentioned above, when there is a situation that recognition cannot be made or there is a mistake in recognition, at recognition failure finding disposition step 73, it abstracts such situation and hand in to inquiry disposition step 74. The inquiry disposition step 74 is a disposition that notifies to a human being as operator or expert, receives input from such person, and registers it to the data base 76.

In the not-full condition firing disposition step 77, DEMON that keeps watching a group of objects 72, checks a memory of each object every 2 seconds, and if there is a firing condition, even if it is not-full one, checks a object existing on the lower information stream and, if necessary, makes said object fire or resets its memory.

In the above description, the DEMON checks a group of objects every 2 seconds. However, it should be noted that it is changed according to the recognition target and it is not limited to this example.

As explained above, according to the present invention, disposition of unnecessary enormous images, if they are image dispositions, is not needed and disposition of minimum volume of necessary image is enough to be dealt with, so it has a merit that makes system size small.

In the same way, in the disposition of sensor information except images, too, when there are many sensors, or when it is necessary to complicated relative dispose of the picked-up condition from each sensor, it just do necessary disposition without unnecessary disposition. And it has a merit that makes possible the effective disposition of information from sensors.

And by adding feedback that takes judgment of operator or know-how, it can have a growth process that raises recognition precision.

What is claimed is:

1. (amended) A recognition target identifying system of computer by comparing at least three target parts of recognition target with the corresponding parts of recognition target candidate which have been recorded in advance and then identifying the object wherein said system comprises,

an object definition dictionary for recording firing condition and recognition target candidate which are divided into more than 3 target parts and/or recording object definition;

sensor means recognizing a recognition target;

data disposition means connected to said sensor means for pre-disposing, such as cutting and dividing the data taken in by said sensor means into each of the target parts;

at least 3 recognition target judgment objects connected to said data disposition means, said recognition target judgment objects having a memory in which data definition corresponding to each of the target parts and the firing condition are recorded, and being designed to fire when it satisfies the data definition recorded and the firing condition recorded;

a plural of recognition signal transmission objects of hierarchy construction including self-designation one(s) having a memory in which respective object definition and its firing condition are recorded, each of said recognition signal transmission objects being connected to one or more of the recognition target judgment object(s) or the lower level recognition signal transmission objects such that they are constructed to decrease gradually the number on the same level, and being designed to fire when it satisfies the respective object definition recorded and the respective firing condition recorded; and,

definition setting means connected to the object definition dictionary, the recognition target judgment objects and/or the recognition signal transmission objects, said definition setting means taking the firing condition, the data definition and/or the object definition out and recording the same in the respective object.

2. (amended) A recognition target identifying system of computer defined in Claim 1 being characterized in that there exist a plural of said recognition

target candidate, and, said at least 3 recognition target judgment objects and a plural of recognition signal transmission objects are set up as an unit for each of said recognition target candidate, and said definition setting means take(s) the firing condition, the data definition and/or the object definition off with respect to the respective recognition target candidate and record(s) the same on the respective object of each unit.

3. (amended) A recognition target identifying system of computer defined in Claim 1 or 2 being characterized in that said pre-disposing is at least one of pattern matching, tracking, functioning, on/off signalizing, numeralizing, coordinating, parametering and outlining.

4. (amended) A recognition target identifying system of computer defined in any of Claims 1-3 being characterized in that said sensor means is(are) at least one of a camera, an image scanner, a microphone, a thermometer, timer and switch.

5. (amended) A recognition target identifying system of computer defined in Claim 4 being characterized in that said sensor means is(are) perceiving means for perceiving at least one of animation, stationary images, lines, dots, words, characters, voices, sounds, times and electrical signals.

6. (amended) A recognition target identifying system of computer defined in any of Claim 1-5 wherein said system further includes,

recognition failure finding disposition means connected to said objects for producing recognition signal when it succeeds in the recognition of input signal or recognition failure signal when it fails to recognize,

inquiry disposition means connected to the recognition failure finding disposition means for inquiring to an operator according to said recognition failure signal,

response acquisition means connected to the inquiry disposition means for acquiring response from said operator, and

response registration disposition means connected to the response acquisition means and said objects for registering the response from said response acquisition means on the object definition dictionary.

7. (amended) A recognition target identifying system of computer defined in Claim 1 wherein said system further includes,

not-full condition firing disposition means for watching each of said objects and for investigating the related object to let the same fire, if needed, or reset the memory when some of said firing condition is satisfied.

8. (amended) A recognition target identifying method of computer by comparing at least three target parts of recognition target with the corresponding parts of recognition target candidate which have been recorded in advance and then identifying the object wherein said method comprises steps of,

recording firing condition and recognition target candidate which are divided into more than 3 target parts and/or recording object definition in an object definition dictionary;

providing recognition target judgment objects for each of said target parts of recognition target that judges identity between said at least three target parts of the recognition target and said corresponding parts of the recognition target candidate which have been recorded in advance;

providing a plural of recognition signal transmission objects of hierarchy construction that judges genuineness of one or plural of target parts of the recognition target, said recognition signal transmission objects are connected to one or more of the recognition target judgment objects or the lower level recognition signal transmission objects such that they are constructed to decrease gradually the number with coming up of level in hierarchy;

recording the data definition corresponding to each of the target parts and the firing condition on a plural of the recognition target judgment object(s) while recording the recognition target definition and the firing condition on the recognition signal transmission object(s) after taking the respective ones;

recognizing a recognition target by sensor means,

pre-disposing such as cutting and dividing the data taken in by said sensor means into each of the target parts at data disposition means;

sending the data cut into the respective target part at the data disposition means to the recognition target judgment object for said target part;

firing when it satisfies the data definition recorded and the firing condition recorded at the recognition target judgment object;

firing the recognition signal transmission object when the output from said recognition target judgment object or said lower level recognition signal transmission object satisfy the respective object definition recorded and the respective firing condition recorded; and,

outputting a recognition signal that means success in recognition when output from the predetermined lower level recognition signal transmission object satisfies said object definition and said firing condition

at the most upper level recognition target transmission object.

9.(amended) A recognition target identifying method of computer defined in Claim 8 being characterized in that

there exist a plural of said recognition target candidate; said object definition etc. recording step comprises a step of recording the firing condition, the data definition and/or the object definition with respect to the respective recognition target candidate on said object definition dictionary;

said recognition signal transmission object providing step comprises a step of providing said recognition target judgment objects and said recognition signal transmission objects in a predetermined connecting arrangement for each of the recognition target candidate;

said data sending step to the recognition target judgment object comprises a step of sending the data cut into the respective target part at the data disposition means to the respective unit for the recognition target candidate;

said recognition target judgment object firing step and the recognition signal transmission object firing steps comprise steps of firing the both simultaneously for the respective recognition target candidate; and,

said recognition signal outputting step comprises a step of outputting the recognition signal only at the succeeded unit.

10. (amended) A recognition target identifying method of computer defined in Claim 8 or 9 being characterized in that said pre-disposing is at least one of pattern matching, tracking, functioning, on/off signalizing, numeralizing, coordinating, parametering and outlining.

11. (amended) A recognition target identifying method of computer defined in any of Claims 8-10 being characterized in that said sensor means is(are) at least one of a camera, an image scanner, a microphone, a thermometer, timer and switch.

12. (amended) A recognition target identifying method of computer defined in Claim 11 being characterized in that said sensor means is(are) perceiving means for perceiving at least one of animation, stationary images, lines, dots, words, characters, voices, sounds, times and electrical signals.

13. (amended) A recognition target identifying system of computer defined in any of Claim 8-12 wherein said method further includes steps of,

producing the recognition signal when it succeeds in the recognition of input signal or recognition failure signal when it fails to recognize;

inquiring to an operator according to said recognition failure signal;

acquiring response from said operator, and

registering the response from said response on the object definition dictionary.

14. (amended) A recognition target identifying method of computer defined in Claim 8 wherein said method further includes a step of not-full condition firing disposition step comprising of,

watching the respective object and, when some of said firing condition is satisfied, investigating the related object to let the same fire, if needed, or reset a memory.

Abstract

The necessary information of recognition target is defined in advance, and an input signal from the sensor is retrieved only when it satisfies the definition so that recognition disposition is conducted at such time only. Moreover, the operator makes feedback to the result of recognition so that it has the growing function in recognition precision.

In the input signal recognition from the sensor, in particular, when there is a great amount of sensor's information, it can dispose of input signal recognition efficiently.

Fig.1

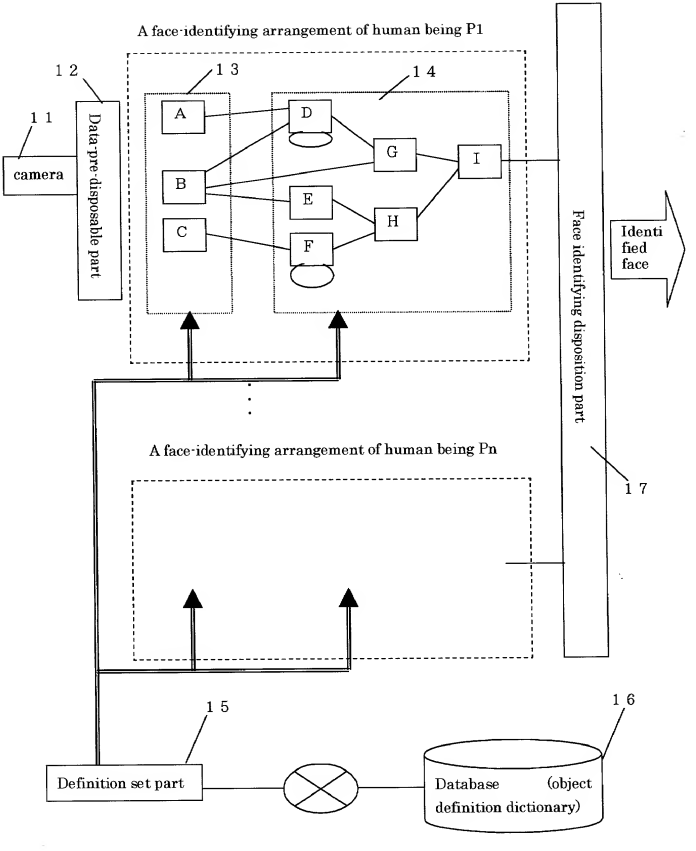

A face-identifying arrangement of human being P1
12
13
14
11
camera
Data pre-disposable part
A
B
C
D
E
F
G
H
I
Face identifying disposition part
Identified face
A face-identifying arrangement of human being Pn
17
15
16
Definition set part
Database (object definition dictionary)

Fig.2

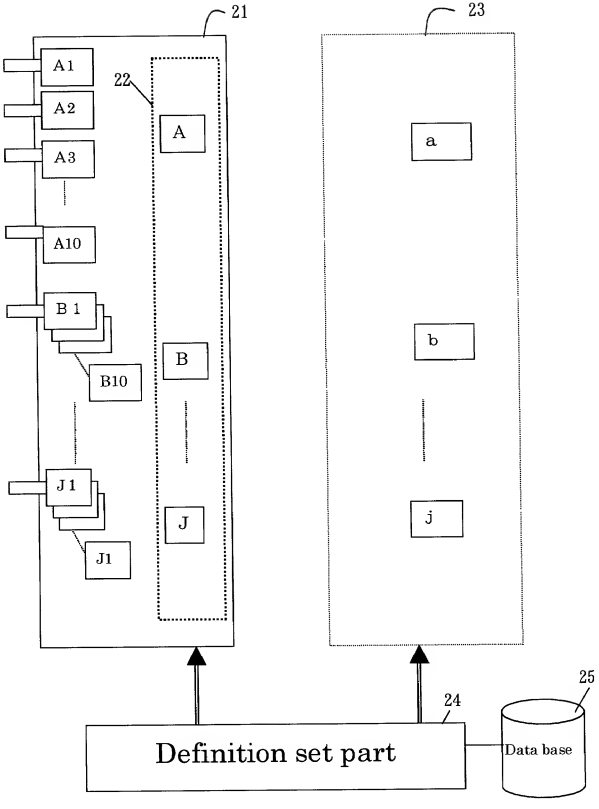

21
23
A1
A2
A3
A10
B 1
B10
J 1
J1
22
A
B
J
a
b
j
24
25
Definition set part
Data base

Fig.3

A	280<A<290
B	285<B<295
C	285<C<295
D	285<D<295
E	280<E<290
F	275<F<285
G	280<G<290
H	275<F<285
I	280<I<290
J	290<J<300

Fig.4

	condition	disposition
A	Out of range A	Set in "a" a number of sensor and temperature data that is a falls out of the range
B	Out of range B	Set in "b" a number of sensor and temperature data that is a falls out of the range
C	Out of range C	Set in "c" a number of sensor and temperature data that is a falls out of the range
D	Out of range D	Set in "d" a number of sensor and temperature data that is a falls out of the range
E	Out of range E	Set in "e" a number of sensor and temperature data that is a falls out of the range
F	Out of range F	Set in "f" a number of sensor and temperature data that is a falls out of the range
G	Out of range G	Set in "g" a number of sensor and temperature data that is a falls out of the range
H	Out of range H	Set in "h" a number of sensor and temperature data that is a falls out of the range
I	Out of range I	Set in "i" a number of sensor and temperature data that is a falls out of the range
J	Out of range J	Set in "j" a number of sensor and temperature data that is a falls out of the range

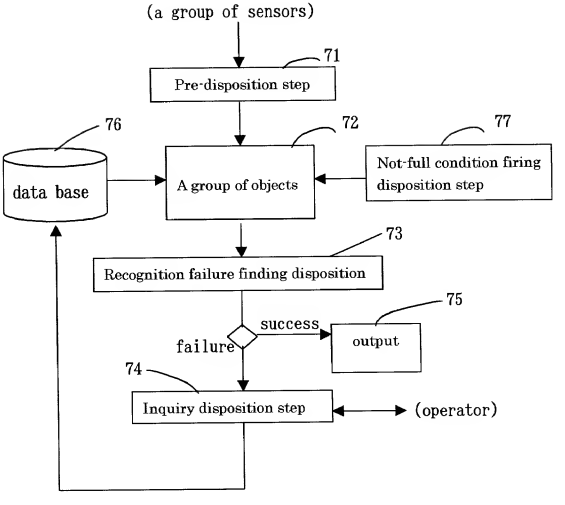
Fig.5

a	2 9 3<A1
b	2 9 8<B1
c	2 8 2<C3　2 9 8<C5
d	D5<2 8 3
e	2 9 8<E7
f	F1<2 7 3　2 8 8<F3
g	G9<2 7 8　2 9 3<G10
h	H8<2 7 3　2 8 8<H10
i	I4<2 7 8　2 9 3<I6
j	3 0 0<J5

Fig.6

a	More than 2 that is out of the range
b	More than 2 that is out of the range
c	More than 2 that is out of the range
d	More than 3 that is out of the range
e	More than 3 that is out of the range
f	More than 2 that is out of the range
g	More than 4 that is out of the range
h	More than 2 that is out of the range
i	More than 2 that is out of the range
j	More than 2 that is out of the range
condition	That number of the objects "a～j" that satisfies the above condition > 2
disposition	Output a signal showing unusual state, place of such unusual block and its temperature data

Fig. 7



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DECLARATION FOR U.S. PATENT APPLICATION & POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below), or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a United States patent is sought on the invention entitled:

AN INPUT SIGNAL RECOGNITION SYSTEM HAVING GROWING FUNCTION THROUGH FEEDBACK

the specification of which is attached hereto, unless the following box is checked:

[X] was filed on _____, 199__, as U.S. Patent Application _____, or PCT International Application PCT/JP00/00534 and was amended on February 5, 2001 (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, and as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim the benefit under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventor's certificate listed below, and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s):			Priority Claimed
59106/1999 (Appln. #)	Japan (Country)	1 February 1999 (Day/Month/Year Filed)	[X] Yes [ ] No
_____ (Appln. #)	_____ (Country)	_____ (Day/Month/Year Filed)	[ ] Yes [ ] No
_____ (Appln. #)	_____ (Country)	_____ (Day/Month/Year Filed)	[ ] Yes [ ] No

I hereby claim the benefit under Title 35, United States Code, Sections 119(e) and 120 of any United States patent application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

PCT/JP00/00534	01 February 2000	Pending
(Appln. #)	(Day/Month/Year Filed)	(Status: patented, pending, abandoned)
(Appln. #)	(Day/Month/Year Filed)	(Status: patented, pending, abandoned)

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the U.S. Patent and Trademark Office connected therewith: Glenn F. Ostrager, Reg. No. 29,963; Leighton K. Chong, Reg. No. 27,621; Dennis M. Flaherty, Reg. No. 31,159; Dara L. Onofrio, Reg. No. 34,889; Joshua S. Broitman, Reg. No. 38,006; Manette Dennis, Reg. No. 30,623.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1-00

Dated: 2001. 07. 11

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